



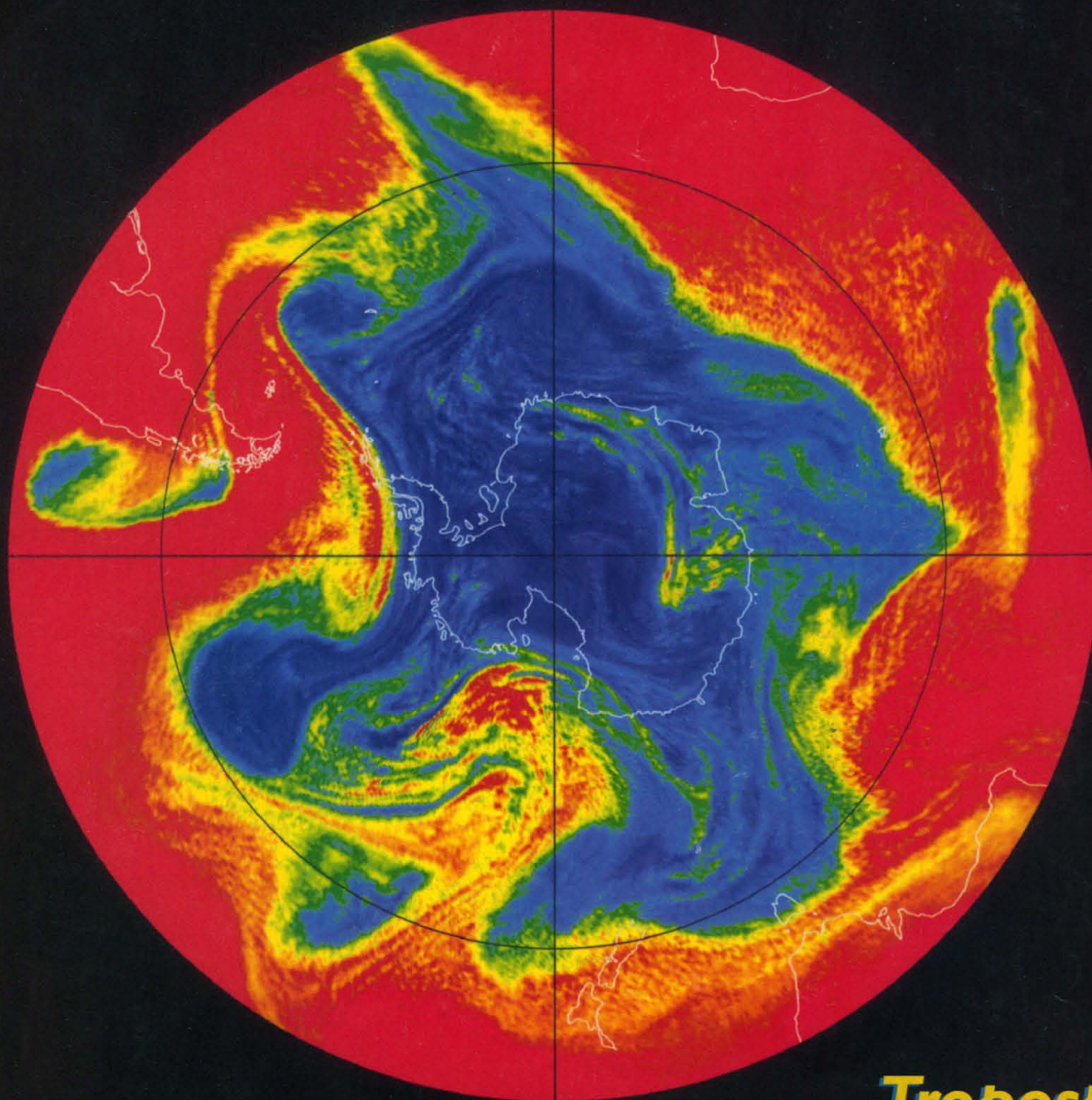
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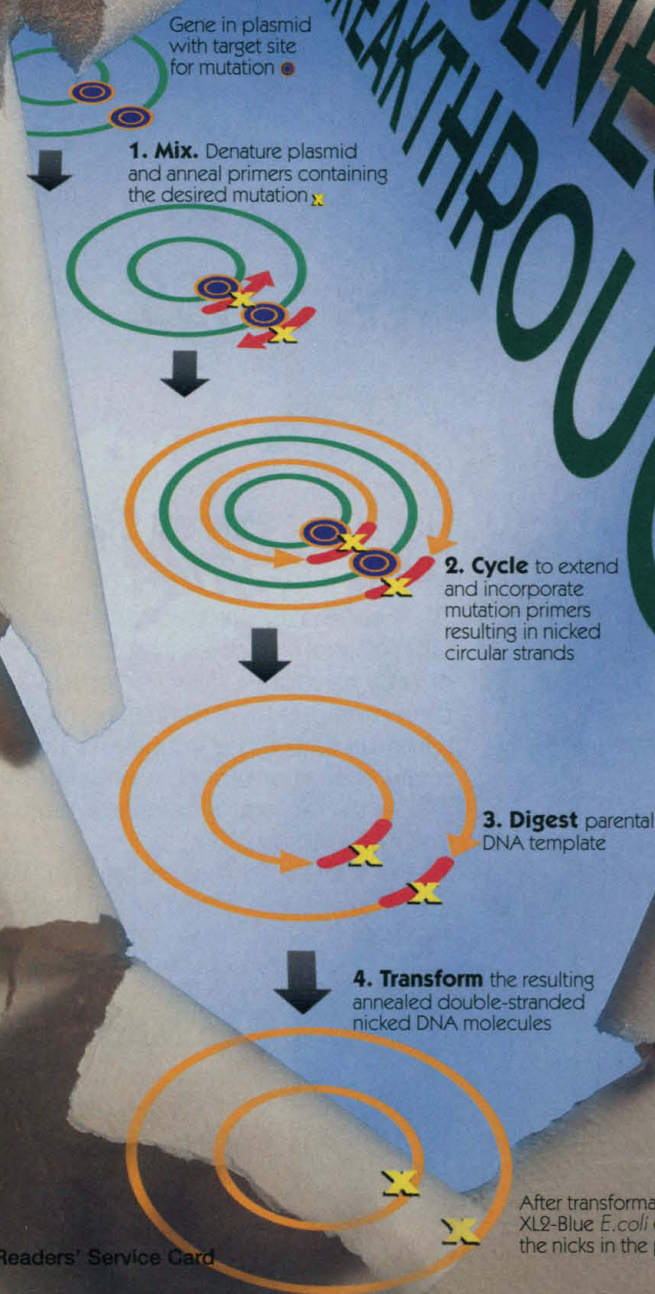
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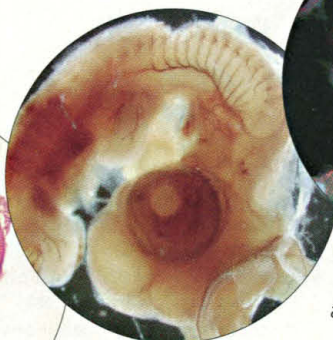


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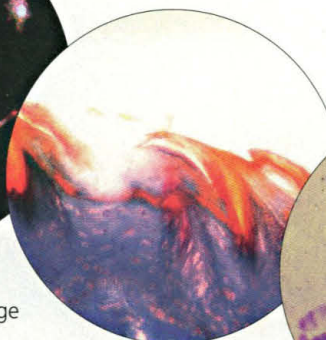
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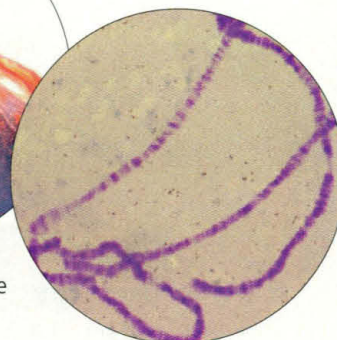
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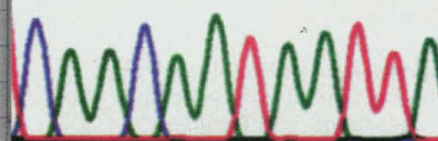
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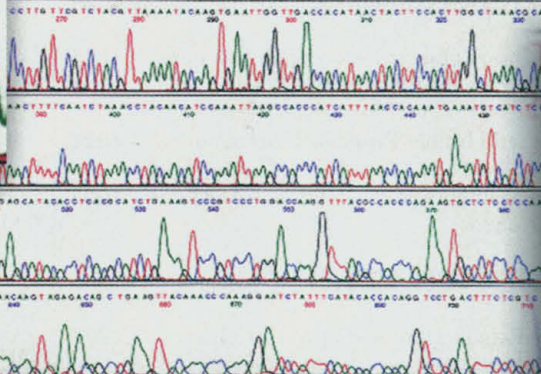
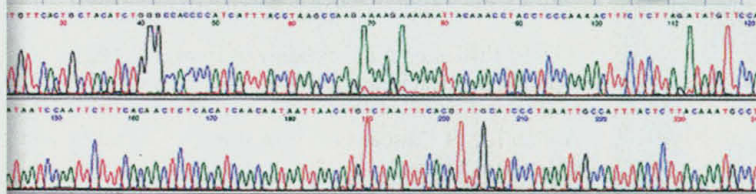
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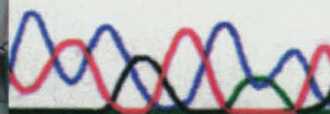
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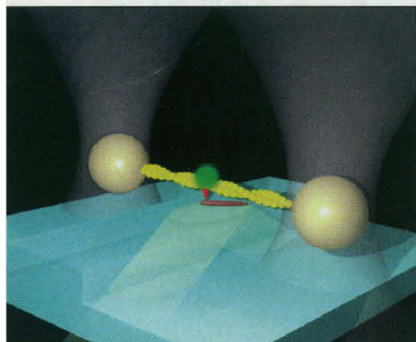
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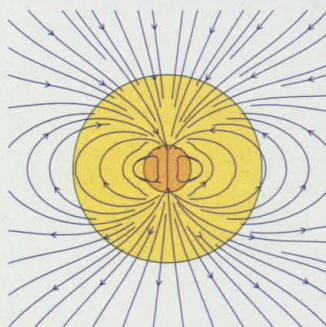
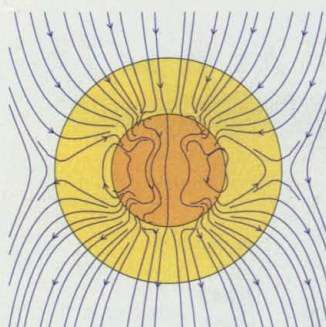
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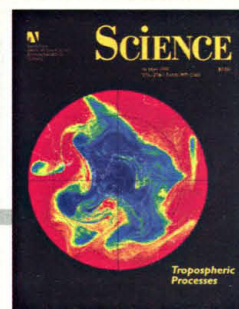
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COVER

Simulated mixing ratio of atmospheric nitrous oxide on the Southern Hemisphere 320 K potential temperature surface. Continental boundaries are indicated in white. The sharp gradient on nitrous oxide (blue edge) marks the meandering jet stream and the boundary between

the stratosphere (blue) and the troposphere (red and yellow). See page 1079 and the special section on tropospheric processes beginning on page 1039. [Image: J. D. Mahlman]



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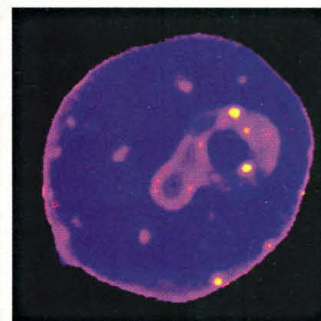
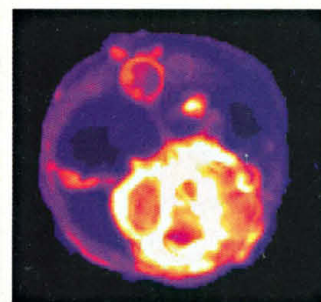
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1031 & 1122 Networking for food

Indicates accompanying feature

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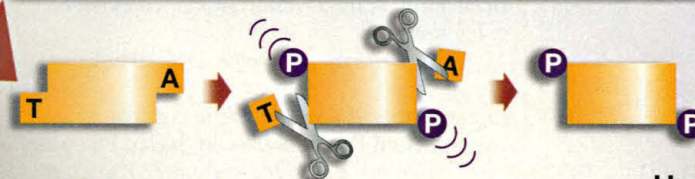
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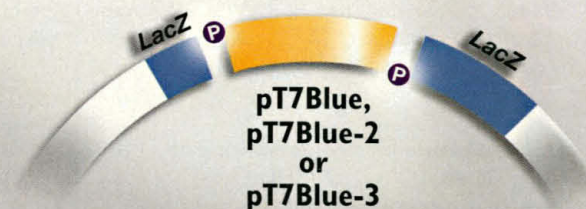
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1. Brownstein, J.M., et al. (1996) *BioTechniques* **20**, 1004–1010.
2. Magnuson, V.L., et al. (1996) *BioTechniques* **21**, 700–709.
3. Novy, R.E., Yeager, K.W., and Kolb, K.M. (1996) *InNovations* **6**, 7–11.

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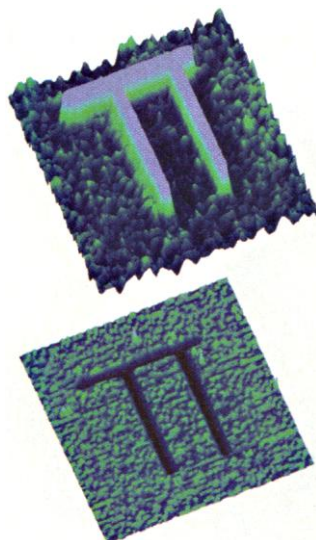
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Reversible writing

Ferroelectric materials are of interest for device construction because their characteristic polarization field, which can be reversed, remains after power is shut off to the circuit. Ahn *et al.* (p. 1100) show that micrometer-size areas of different polarizations could be written



into high-quality heterostructures of lead strontium titanate and strontium ruthenate. A metallized atomic force microscope tip, scanning in a non-contact mode, provided the local electric field for changing the polarization in these ferroelectric films.

Saturated x-ray lasers

Practical applications of x-ray lasers would require that their output be saturated so that they are stable and produce the maximum operating power. Many of the materials used for the plasmas that produce the x-rays require steep increases in driving laser power for wavelengths below 10 nanometers. Zhang *et al.* (p. 1097) demonstrate an efficient saturated samarium x-ray laser operating at 7 nanometers. A low-intensity

Delaying a model prion disease

Protease-resistant forms of prion proteins (PrPres) are thought to be involved in Creutzfeldt-Jakob disease in humans and the spongiform encephalopathies of cattle that appear to have recently spread to human populations. The structure of PrPres has features that resemble those of amyloid proteins. A derivative of doxorubicin, IDX, has previously been used to treat patients with different cancers and has been shown to bind strongly to amyloid fibers. In a model system for prion diseases, experimental scrapie induced by injection of brain material into Syrian hamsters, Tagliavini *et al.* (p. 1119) show that symptoms of disease were delayed if the animals were simultaneously treated with IDX.

laser prepulse is used to produce a more uniform plasma for the main excitation laser pulse.

Wetter, but when?

Chondrites are thought to represent the most primitive materials found in meteorites, and carbonaceous chondrites have exhibited inclusions of relatively rare hydrous mineral phases. Brearley (p. 1103), using high-resolution transmission electron microscopy, has found more abundant and widespread hydrous phases that replace pyroxenes along fractures in seven carbonaceous chondrites from the Allende meteorite. The author discusses whether this aqueous alteration occurred in the preaccretionary, nebular stage or while the chondrules resided on the meteorite's parent body.

Galilean dynamos

Data from the magnetometer on board the Galileo orbiter has indicated that two of the jovian satellites, Io and Ganymede, have intrinsic magnetic fields. Sarson *et al.* (p. 1106) performed two-dimensional magnetohydrodynamic simulations and found that Ganymede's

field is probably produced by its own dynamo, suggesting that the largest of the Galilean satellites has internal convection. For Io, which has active volcanism (considered to be a surface expression of a convecting interior) and also orbits closer to Jupiter than Ganymede, the simulations cannot distinguish between an internal dynamo or generation of Io's field by the ambient jovian magnetic field.

Titin tightness

Individual molecules of titin, a component of striated muscle, are of the order of a micrometer in length and are thought to provide a passive restoring force as muscles elongate. How is this force generated and what is its magnitude? Rief *et al.* (p. 1109), using atomic force microscopy, and Kellermayer *et al.* (p. 1112), using laser tweezers, measured the mechanical properties of single titin molecules (see the Perspective by Erickson, p. 1090). Pulling extends the molecule in 25-nanometer increments, corresponding to the stepwise unfolding of tandemly arrayed immunoglobulin domains, and the measured forces depend on the rate of extension, approaching several hundred piconewtons at an exten-

sion rate of 1 micrometer per second. Release or relaxation allows both for rapid refolding and for the measurement of entropic elasticity. Scaling these data to macroscopic dimensions reproduces measurements made on whole muscle fibers.

Laying down plans

The basic axes of the vertebrate body plan are established early in oogenesis, when RNA molecules are localized to specific regions of the oocyte. The localized RNA molecules then remain quiescent, awaiting later times in development to be translated into protein. In the frog, *Xenopus*, one of the more important RNA molecules encodes Vg1, a growth factor that directs mesoderm development. Deshler *et al.* (p. 1128; see the Perspective by Etkin, p. 1092) show that localization of Vg1 mRNA to the oocyte's vegetal pole involves interaction with a protein named Vera and an association with a specialized fraction of the endoplasmic reticulum.

Cell stickers

Oligosaccharides on cell surfaces can be chemically modified to present unusual functional groups for recognition or reaction. Mahal *et al.* (p. 1125) incorporated an unnatural derivative of *N*-acetylmannosamine bearing a ketone group into cells, where it was converted metabolically into a cell surface molecule. The ketones could be used to attach a biotin tag to the cell; this in turn allowed selective lethal targeting of cells with a ricin A chain attached to avidin, which binds to biotin.

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Fig. 1. Multicolor detection using TSA-Direct.
Courtesy of Kevin Roth, M.D., Washington University
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Fig. 1.

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Fig. 2

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d. TSA-Enhanced chromogenic ISH.

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Figs. 2 a-b. Fluorescent detection of chromosome centromere probes in metaphase spreads.
Figs. 2 c-d. In situ chromogenic detection of oxytocin in rat brain tissue sections.

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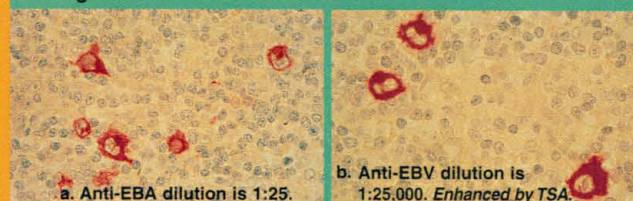
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Fig. 3



a. Anti-EBA dilution is 1:25.

b. Anti-EBV dilution is 1:25,000. Enhanced by TSA.

Figs. 3 a-b. IHC of EBV antigen in Hodgkin's Lymphoma of mixed cellularity.
Courtesy of R. Von Wasielewski and S. Gignac, Pathologisches Institut de
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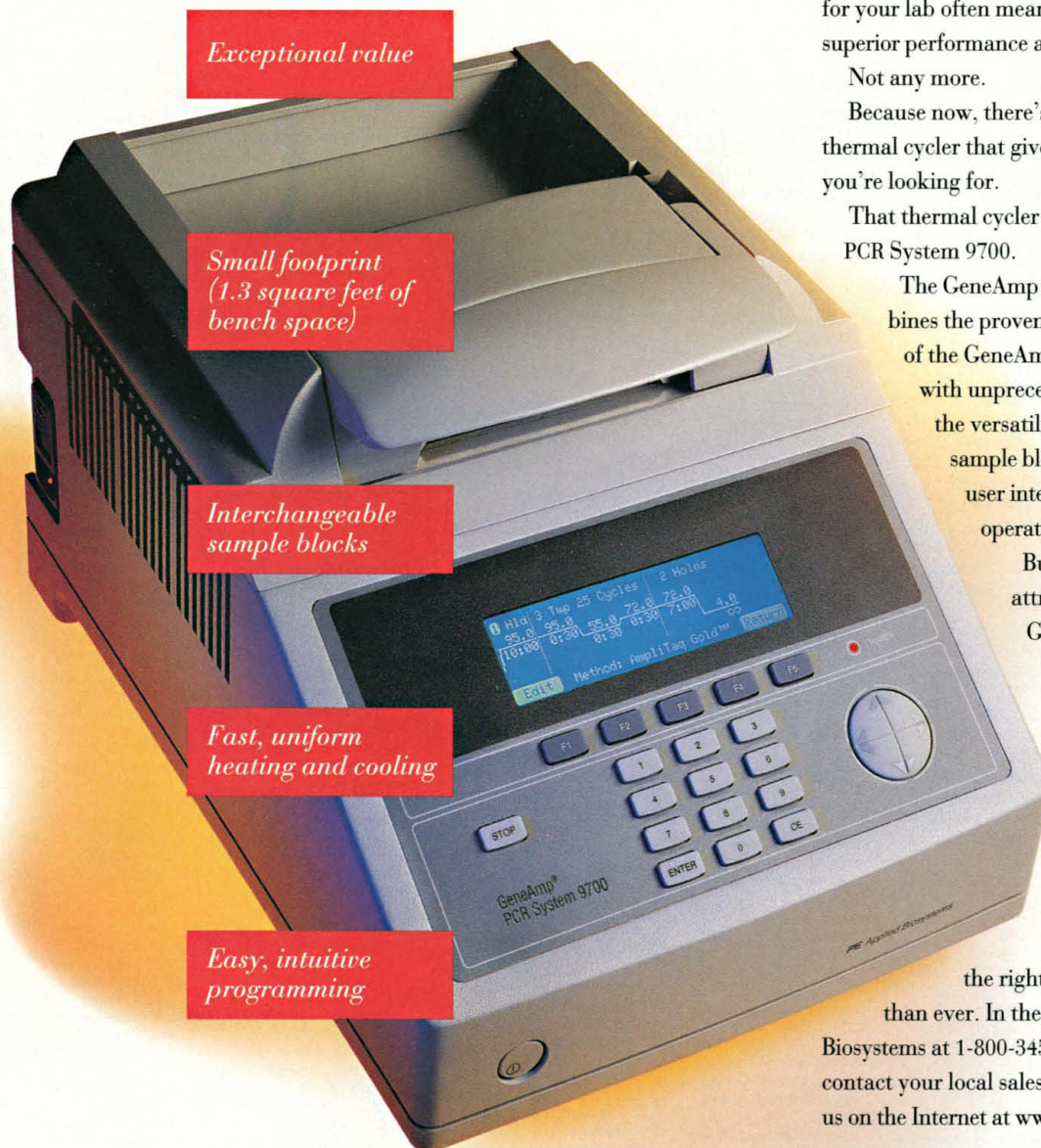
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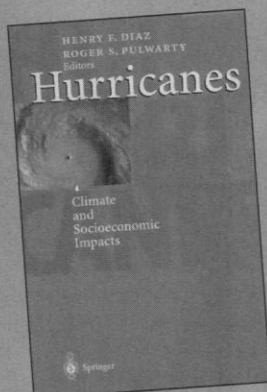


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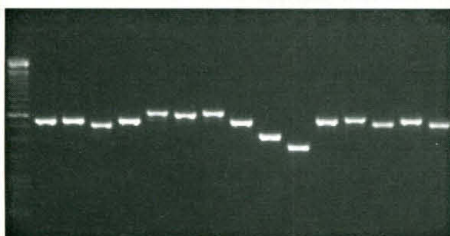
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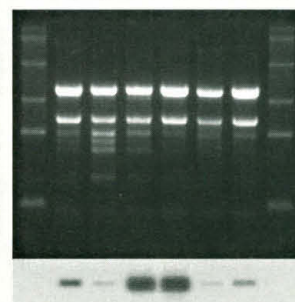


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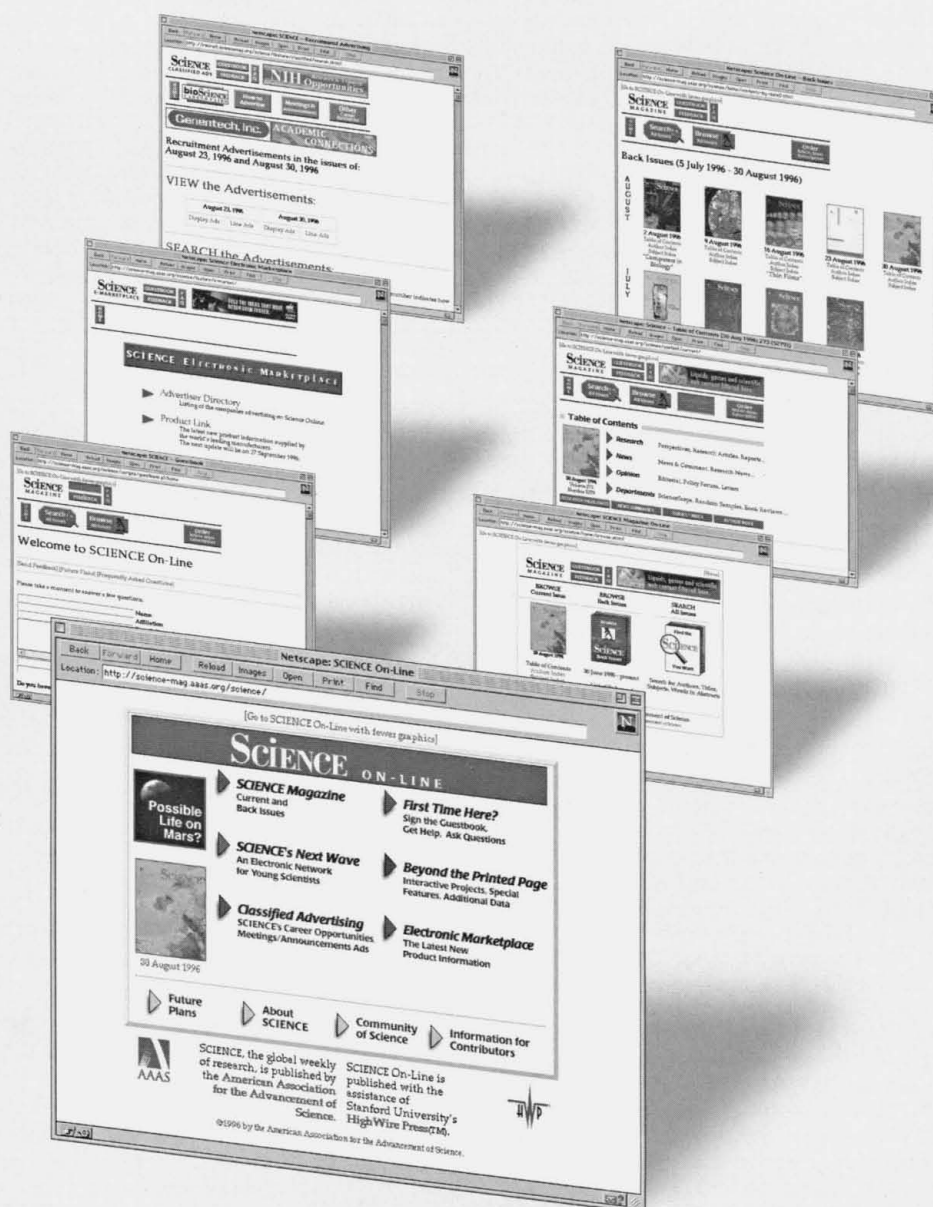
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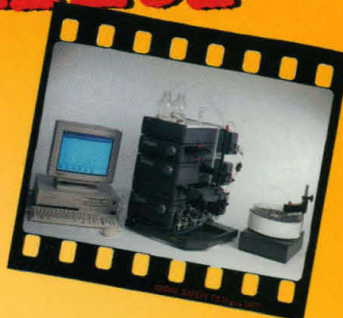
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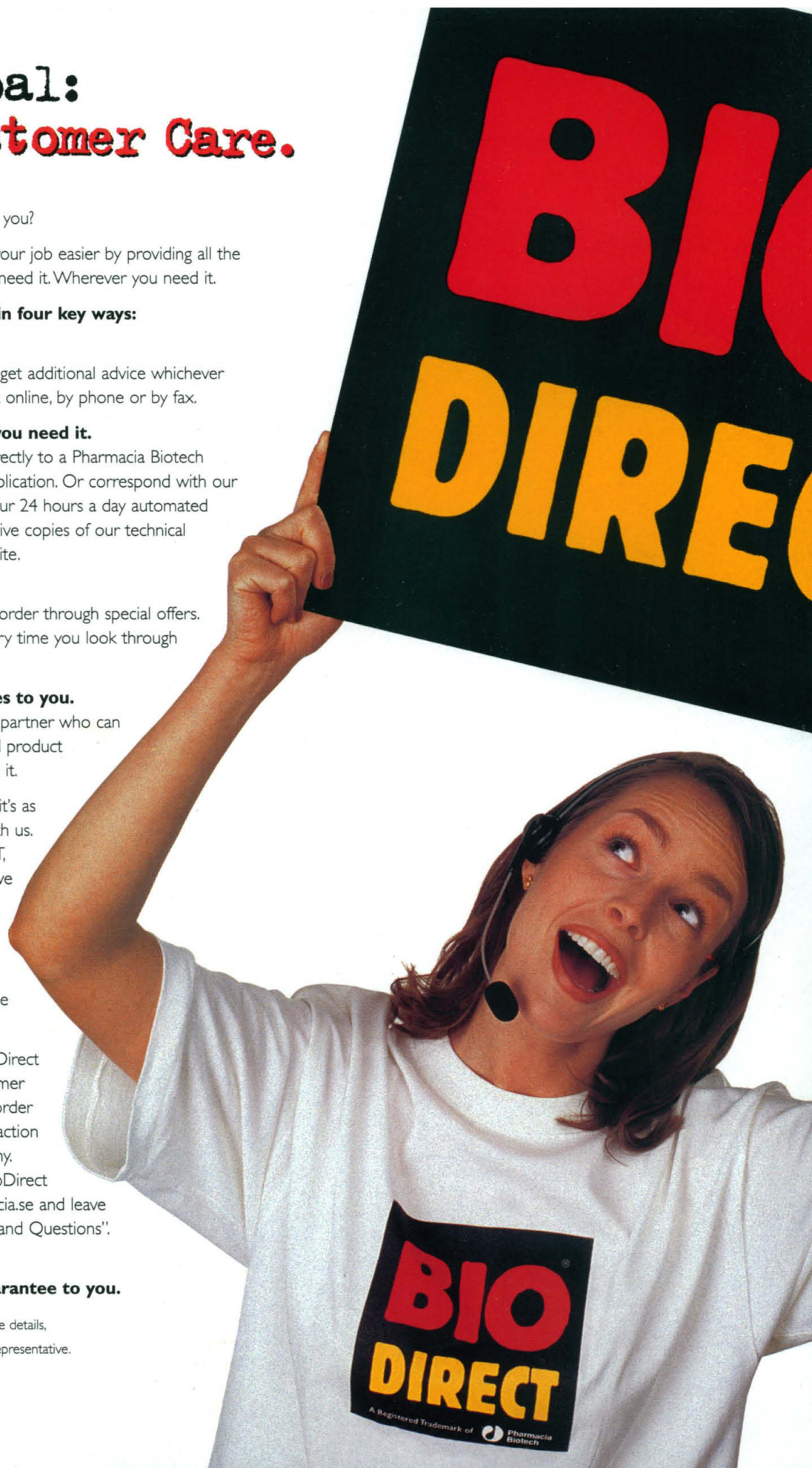
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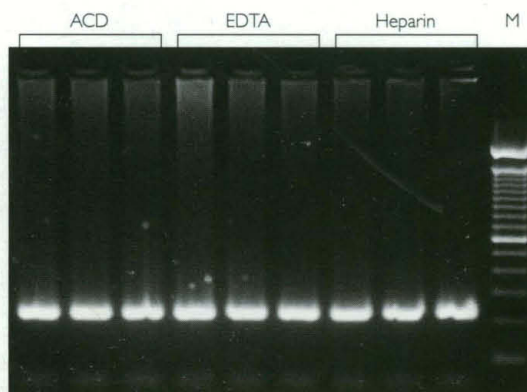
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New GenomicPrep™ DNA Isolation Kits are designed to isolate high quality genomic DNA from cultured cells, body fluids, whole blood, animal and plant tissue, and gram-negative bacteria. The procedure gives typical yields of 35 µg per 1 ml of whole blood (7×10^6 nucleated cells), with an $A_{260/280}$ of 1.7-2.0. One kit processes samples of 1×10^2 to 1×10^8 culture cells, 30 ml to 10 ml of whole blood and up to 0.5 mg of animal tissue.

Convenient to use. No special equipment required. No mixing or dilution of reagent needed. Procedures are scalable to allow different sample sizes to be processed.

PCR results using genomic DNA isolated from human whole blood collected in three different anticoagulants: ACD (acid citrate dextrose), EDTA or heparin. Primers used in PCR were specific for the Factor V gene. Reactions were performed in triplicate with the following amplification parameters: 30 cycles of 94 °C for 1 minute; 58 °C for 1 minute; 72 °C for 1 minute. Each lane contained 1/5 of the reaction. Gel electrophoresis was carried out for 1 hour at 85 volts (2.0% agarose gel).

M = Marker.



Rapid results. Pure genomic DNA can be isolated in approximately 1 hour.

Safer operation. No toxic organic solvents such as phenol or chloroform are used.

No further purification needed.

DNA can be used directly in procedures such as Southern hybridizations and RFLP analyses.

GenomicPrep DNA Isolation Kits include:

- RBC Lysis Solution (Blood Kit only)
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- RNase A Solution
- Protein Precipitation Solution
- DNA Hydration Solution


Starting Source	Yield (range)	Yield (average)
Mammalian whole blood (0.3 ml)	5-15 µg	10 µg
Chicken blood (nucleated RBCs)	2.5-7.5 µg/µl	4.6 µg/µl
Chicken liver	3-8 µg/µg	6.4 µg/mg
Drosophila (single fly)	0.3-1.5 µg/fly	N/A
Mouse tail	2.0-3.5 µg/mg	2.5 µg/mg
Paraffin embedded tissue	0.1-2 µg/mg	N/A
E.coli culture	2.5-7.5 µg/ml	50 µg/ml
Cultured dog cells	6-26 µg/ 10^6 cells	20 µg/ 10^6 cells
Alfalfa cotyledons	0.1-0.6 µg/mg	0.5 µg/mg

DNA yields using GenomicPrep DNA Isolation Kits with varying starting sources.

Product	Qty	Code No.	Price
GenomicPrep Cells & Tissue Isolation Kit	1	15-0138-13	\$80
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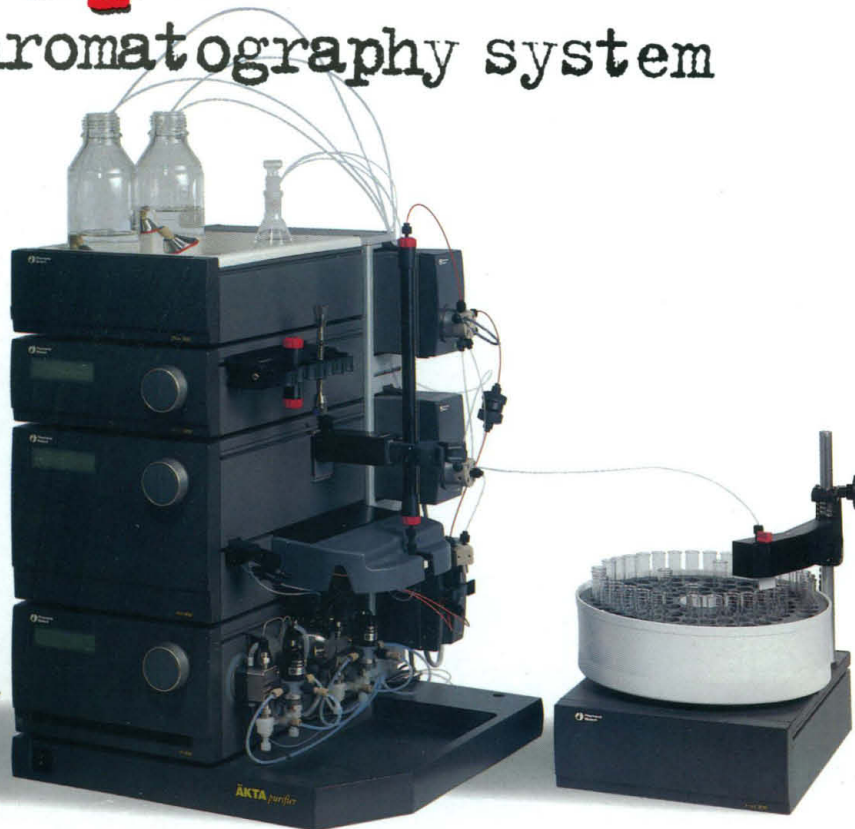
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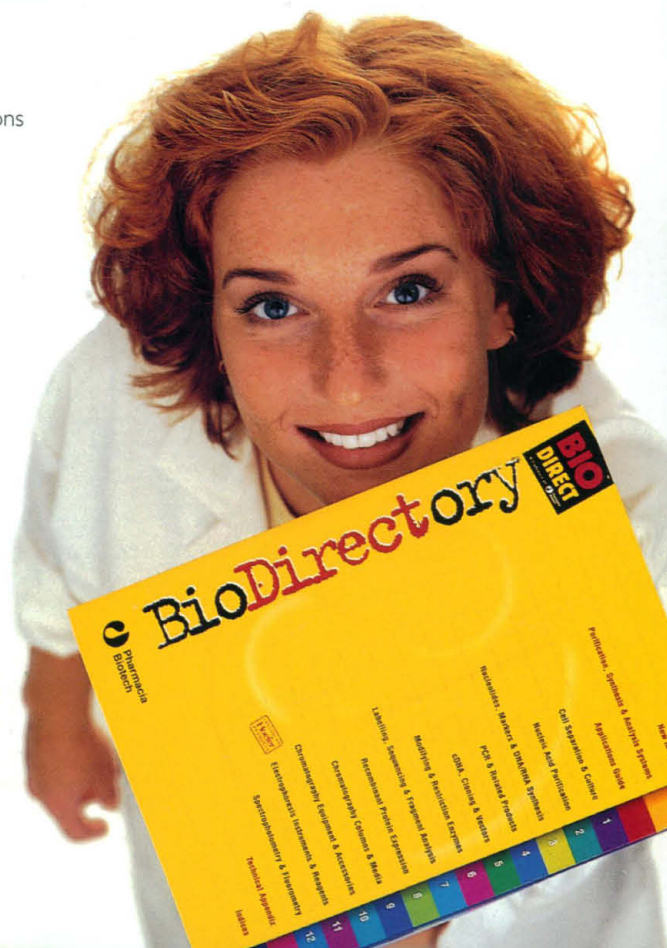
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- Automatic, accurate buffer preparation from stock solutions without manual titration. Automatic evaluation and report procedures.
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µRPC C2/C18 ST4.6/100	1	15-0146-13		\$375
SOURCE 15RPC ST4.6/100	1	15-0147-13		325
Mini Q PE 4.6/50	1	15-0144-13		800
Mini S PE 4.6/50	1	15-0145-13		800
Superdex Peptide PE 7.5/300	1	15-0148-13		950

BioFAX documents: µRPC-18111945; Mini Q & S-18111947; Superdex-18111946

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1. What is the fractionation range of the Superdex® Peptide range of columns?
2. Which Superdex Peptide column is recommended for use with ÄKTApurifier?
3. What is the working pH range of RESOURCE® RPC columns?
4. Which RESOURCE RPC column is recommended for rapid screening?
5. What is the maximum working pressure and suggested flow rate of the MiniBeads Q and MiniBeads S columns which are recommended for use with ÄKTApurifier?

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Superdex and Superdex prep grade are available in three selectivity ranges in a variety of pre-packed columns. Prep grade is also available in bulk and Scouting Packs. For additional information about column and package sizes, contact us today or see Pharmacia Biotech's BioDirectory® '97.

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- Selectivity curve is incredibly steep.
- Non-specific interactions are almost non-existent.

Selection Guide

Product	Separation Range (globular protein)	Bead size
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Superdex 75	3.0-70 kD	13 µm
Superdex 200	10.0-600 kD	13 µm
Superdex 30 prep Grade	<10 kD	34 µm
Superdex 75 prep Grade	3.0-70 kD	34 µm
Superdex 200 prep Grade	10.0-600 kD	34 µm

Product	Qty	Code No.	BIO DIRECT	Price
G Superdex Peptide HR 10/30	1	15-0096-13		\$985
Superdex 75 HR 10/30	1	15-0097-13		930
Superdex 200 HR 10/30	1	15-0098-13		940
Superdex 30 prep grade	25 ml	15-0090-13		70
	150 ml	15-0091-13		300
Superdex 75 prep grade	25 ml	15-0092-13		70
	150 ml	15-0093-13		300
Superdex 200 prep grade	25 ml	15-0094-13		70
	150 ml	15-0095-13		300
Gel Filtration Scouting Pack	3 x 25 ml	15-0066-13		210
includes: 1 each of Superdex prep grade				

BioFAX documents: Superdex HR 10/30-18111946; Superdex HR-18103411; Superdex pg-18106086



Fast, easy purification of fusion proteins



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67.0
43.0
30.0
20.1
14.4

1 2 3 4 5 6 7 8

HisTrap Purified (His)6 fusion protein on Silver stained SDS-PAGE PhastGel[®]. Lane 1: LMW Calibration Kit. Lane 2: Cytoplasmic extract, dil. 1:20. Lane 3: Flow-through, dil. 1-10. Lane 4: Wash. Lane 5: (His)6 fusion protein, dil. 1:20. Lane 7: GST, 0.5 mg/ml. Lane 8: LMW.

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The kit includes three HiTrap Chelating columns and buffer concentrates to perform 10-12 purifications.

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- 0.1 M Nickel Sulfate (10 ml)
- Luer adapters, domed nuts, syringe and instructions

Product	Qty	Code No.	Price
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BioFAX document: 18121200

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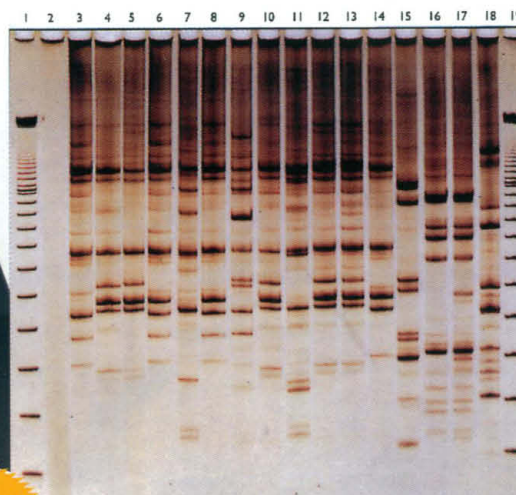
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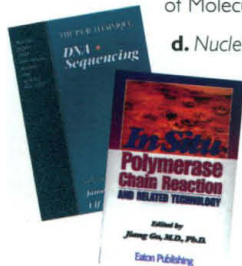
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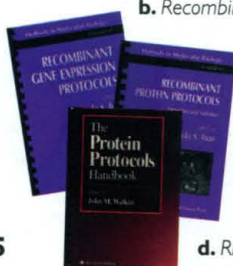
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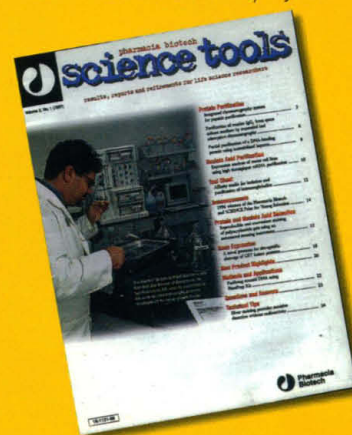


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